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2,270,541

APPARATUS FOR FORMING AERATED CONCRETE SLABS

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2 Sheets-Sheet 1

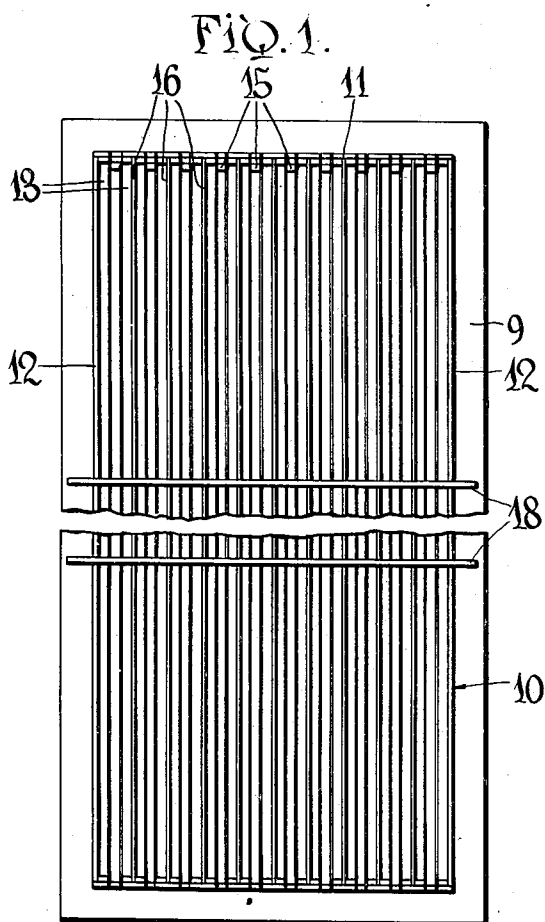


FIG. 2.

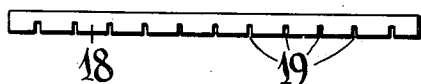


FIG. 3.

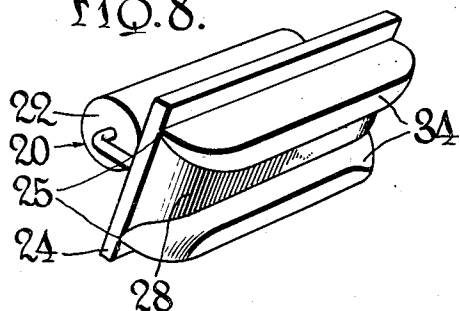
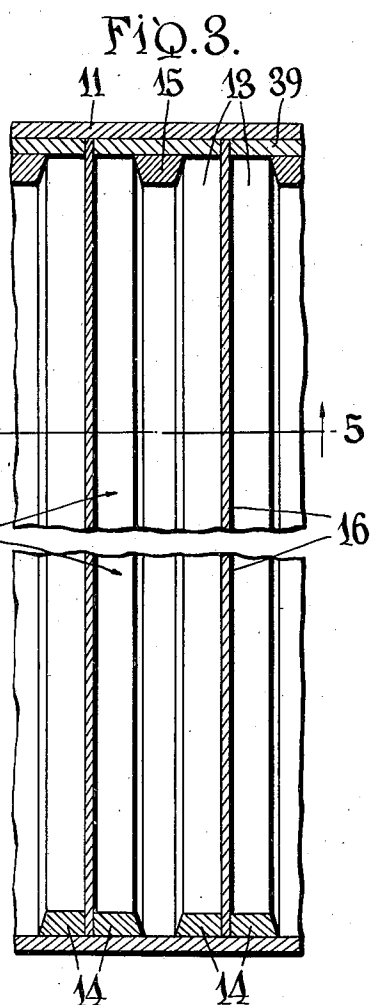
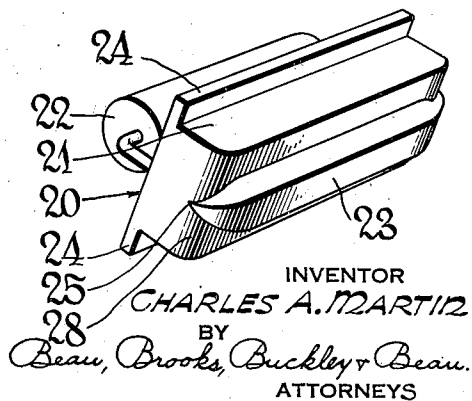


FIG. 5.



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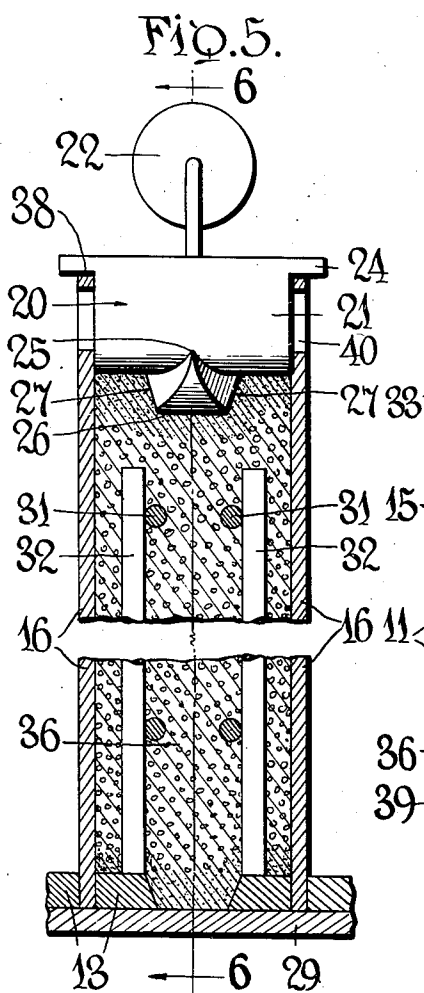
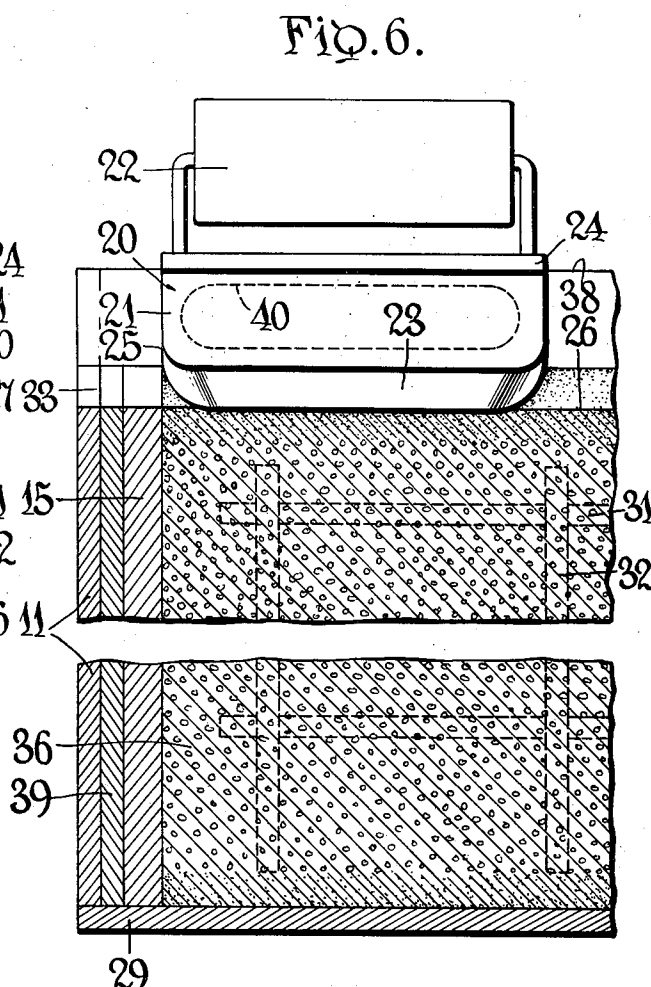
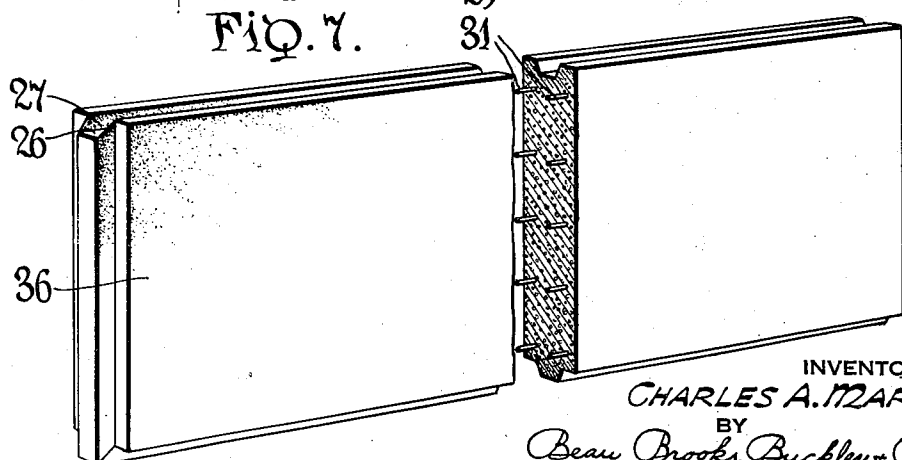
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APPARATUS FOR FORMING AERATED
CONCRETE SLABS

Charles A. Martin, Buffalo, N. Y.

Application February 2, 1939, Serial No. 254,265

1 Claim. (Cl. 25—41)

This invention relates to aerated concrete slabs, and to the method and apparatus for producing the same. More particularly, it relates to tongue and groove concrete slabs of improved strength and of more perfect form.

Aerated concrete slabs, usually provided with reinforcement such as iron or steel bars or rods, have come into extensive use as a building material. They combine the eminently desirable characteristics of lightness in weight and fire-proofness. They are customarily made in convenient sizes, and then assembled in the building of which they form a part. In order to provide convenience and permanence in assembly, they may be provided with tongues or grooves on all four sides.

Such slabs are customarily manufactured in vertical molds, conveniently provided with a number of elongated parallel compartments to make a plurality of slabs at one time. This method combines both compactness and ease of removal of the slabs from the molds. These molds are open at the top, and are provided at the bottom and at the side edges with recesses or projections in order to form the tongues and grooves. Immediately after the concrete is poured into the mold, the top of such mold is closed by placing thereon a cover which is provided on its underside with a recess or projection. This cover is pressed into the soft concrete, forcing it into the recess or onto either side of the projection, thus forming a tongue or groove in the top edge of the concrete slab.

There are several disadvantages attendant upon the use of the devices previously described. In order to obtain proper forming of the top edge of the slab and of the tongue or groove therein, it is required that the mold be filled to a point within very precise limits, which is inconsistent with the type of material being handled in the mold. If the concrete mix placed in the mold is relatively firm, the portions of that mix down in the mold are liable to remain apart or, after the top cover is forced to position, to become dislodged and leave openings, recesses or ragged portions in the top edge of the slab or in the locking recess or projection thereon. If the mix is relatively soft and fluid and if any slight excess quantity happens to be placed in the mold, such excess will be forced upwardly and attempt to escape between the mold cover and the mold. Also, due to the uneven and gritty character of the mix, portions of the mix will adhere to the mold cover at certain points, and will thus destroy the "level" of the top of

the mold and distort the upper edge of the slab and its attendant groove or projection. If there is not a sufficient amount of material placed in the mold, the upper edge of the mold and its locking recess or projection will be weak or imperfect.

The present invention contemplates an apparatus and method whereby concrete mixes of widely varying consistencies may be readily molded into slabs of the type referred to with a maximum degree of uniformity in the shape, size and physical characteristics of the upper edge of the slab and its attendant groove or projection, and a method and apparatus in which no preciseness need be observed as to quantities of mix within the mold and in which varying degrees of excess quantities of mix are readily accommodated without any variation in the size of the slab or the angularity of the upper edge or of the grooves or projections therein.

In the drawings:

Fig. 1 is a plan view of a mold having a plurality of slab-forming compartments;

Fig. 2 is an elevation of a spacing member employed in the mold of Fig. 1;

Fig. 3 is an enlarged fragmentary portion of Fig. 1, partly in cross section;

Fig. 4 is a perspective view of a tool for forming a groove in the top edge of a slab;

Fig. 5 is a slightly enlarged view taken along the line 5—5 of Fig. 3 at the time the tool of Fig. 4 is being used to form a groove;

Fig. 6 is a view taken along the line 6—6 of Fig. 5;

Fig. 7 is a perspective view of a finished slab, with parts broken away for convenience in viewing the internal structure; and

Fig. 8 is a perspective view of a tool for forming a tongue in the top edge of a slab.

Referring to the drawings, a mold 10 consists of a shell having end walls 11, side walls 12 and a bottom wall 29 (Figs. 5 and 6). Inside this shell are elongated tongue and groove-forming members in spaced relationship to each other, and firmly affixed to the end walls 11 and the bottom wall. On the bottom wall these members conveniently consist of tongue-forming members 13, while on one end wall they consist of tongue-forming members 14 and on the opposite end wall of groove-forming members 15 (see Fig. 3), rigidly secured to spacing strips 39. Between adjacent sets of members 13, 14, 15 and 39 are removable partitions 16 dividing the mold into a plurality of compartments 17. In order to prevent deformation of the central portions

of the mold, spacing members 18 are provided, said members having grooves 19 fitting into partitions 16. The entire mold may, if desired, rest upon a platform 9.

The walls and partitions of the mold 10 are preferably of steel sheet or other metal, according to the invention, and, as shown in the drawings (see Fig. 5), it is desirable that the upper edges 38 of the side walls 12 and partitions 16 of the mold be carefully constructed so as to provide trackways 38 in substantially uniform horizontal planes. In the event that the mold walls were made of wood or other readily deformable material, the upper edges of the mold walls would be provided with trackways of metal or other suitable material.

The tongue-forming members 14 and the groove-forming members are of a complementary shape and preferably have tapering side walls of well known shape to aid in the fitting of the slabs together.

In the formation of slabs in such molds, reinforcements are first placed inside the mold. These conveniently consist of horizontal rods 31 and vertical rods 32 held together in the form of a very coarse and open mesh screen. The spacing members 18 are next put into place. An aerated concrete mix is then poured into each compartment so that the top of the poured concrete is approximately on the same level in all compartments, this level being substantially that of the finished slab. This mix may be relatively firm or relatively fluid. In the former case, it may require rodding after pouring. The mass, if fluid when poured, is then allowed to stand sufficiently long to receive an "initial set," i. e., a set firm enough to retain a shape but not so firm but that the shape may not be altered. If relatively firm when poured, no standing period may be required. In this condition, the apparatus or tool shown in Fig. 4 is drawn over the top of the setting concrete mass, as hereinafter described.

This tool is indicated generally at 20, and consists of a body portion 21, of the same width as compartment 17, provided with a handle 22. The upper part of this body portion is provided on each side with a lateral guiding shoulder 24. The bottom of the body portion 21 is also rounded upwardly, as shown at 28, at one or both ends. On the bottom of the body portion is a ridge 23 extending the length of said body portion and of a cross section similar to the cross section of the groove to be formed in the concrete slab, and, therefore, preferably having tapering sides. At one or both ends (at least at the same end as a rounded portion 28) this ridge tapers upwards and at the same time converges sideways to a point, as shown at 25. The tool is preferably made of iron or steel, in order to secure weight and strength, although other materials may be used.

In order to secure the desirable results of this invention, this tool must be pushed or drawn horizontally over the surface of the concrete. The leading end should be tapered as above described. By this means a groove 26 is formed and at the same time the concrete in the path of the ridge, due to the tapering at 25, is compressed both downwardly and to the sides, thus causing the concrete in the side walls 27 of the groove 26 to become denser and thus stronger. If excess material is present in the mold when poured, it will be compressed downwardly by means of the rounded portion 28. If a large excess is present

it will be pushed in front of the tool by the movement thereof and out at the ends of the mold. Due to the sliding movement of the tool, which may be repeated any number of times, the side walls 27, the groove 26, and all surfaces thereof are perfectly and smoothly formed.

When the tool is used, the guiding shoulders 24 rest upon and are guided by means of their cooperation with the trackways 38. The tool, when moved, is thus guided in a true horizontal plane, and at the same time the body portion 21 is confined between the partitions 16, thus centering the tool and causing the edge of the slab and its groove to be in a straight line.

The horizontal movement of the tool preferably extends throughout the length of the slab. In order to accomplish this, the tops of the end walls 11 are lower than the tops of the side walls 12 and partitions 16, being level with the bottom of the body portion 21 of the tool 20, and are provided with notches 33 of cross section similar to that of the groove to be formed in the concrete. The tool 20 may then start and end its horizontal movement outside the mold, passing through the notches 33 in each case. If the concrete is relatively fluid when poured, it may be necessary to temporarily close these notches until the concrete has received its "initial set."

After the groove in the top edge of the slab is thus formed, the slab is allowed to harden. When this has been accomplished, one of the partitions 16 is lifted from the mold by means of hand hold 40. The completed slab, indicated at 36 in Fig. 7, can then be easily removed. It is obvious, of course, that the spacing members 18 must be removed both during the use of the tool 20 and the removal of the slab from the mold.

It will be seen that no precise filling of the mold is required. The only requirement is that there be a minimum filling quantity or some excess thereover. Preferably a slight excess is used, in order to secure uniformity in the slabs. In this case, as the tool is moved along on its trackway across the mold it forces the excess material out at the ends of the mold. At the same time the tool exerts ample pressure upon the upper edge of the mass of mix so as to properly form that edge. Due to the sliding movement of the tool on the trackway there is no chance for any material to remain lodged between the upper edges of the mold and the tool to thereby deform the upper edge of the slab.

Instead of providing a tongue-forming recess at the bottom of the mold, a groove-forming projection may be provided at that point. In this case, the tool 20 is appropriately altered in shape, as in Fig. 8, where 34 indicates a pair of ridges and other numerals correspond to similar numerals identifying the tool shown in Fig. 3, to form a tongue on the top edge of the slab instead of a groove. The words "depression-forming tool," as used throughout the specification and claim, are therefore intended to cover a tool capable of forming a groove, or a tool capable of forming a tongue.

Obviously each mold may, if desired, consist of only a single compartment 17. The expression "mold," as used in the claims, may therefore refer to one or more compartments. The expression "side walls," as used in the claim, is intended to cover either inner side walls (partitions) or outer side walls.

It will be seen that the slab 36 thus formed will have the top edge thereof of greater rather than lesser strength than the rest of the slab, due to

the compression of the material at this point. Likewise, the bottom edge will have somewhat similar characteristics, since the weight of the poured concrete in the mold will cause this portion to become compressed.

As many other modifications may obviously be made without departing from the spirit of the invention, it is not intended to be limited except as defined in the appended claim.

I claim:

Apparatus for forming aerated concrete slabs having tongue and groove edge formations, comprising a mold having relatively flat parallel side walls, and end and bottom walls having formations for producing complementary tongue and groove formations at three edges of a slab being molded, and means for forming an element of a tongue and groove formation in the top edge of a slab being molded and for cooperating with said side walls to compress the material adjacent the top edge of the slab, said means com-

prising an elongated block slidably supported on said parallel side walls of the mold and having side edges received between said side walls, said block having its under surface inclining upwardly at the forward end thereof and said block having a formation on said under surface complementary to the formation to be produced in the top edge of the slab, said formation on said under surface diminishing in cross section toward the forward end of said block, thereby constituting a sled-like deflector adapted to produce the required formation in the slab edge and to cooperate with said upwardly inclined portion of the under surface and with said side walls of the mold to compress the material adjacent the upper edge of the slab and to push forwardly the material in excess of the amount required for compression when the block is slid on said parallel side walls.

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